

Page 36, line 23, after "embodiment," insert --as shown in Fig. 2C,--.

In the Claims

Cancel claims 1-40.

Add new claims 41-64.

*Sub 4*  
41. (Newly Added) A scanned probe microscope apparatus having a probe and a scanning head operably arranged for measuring surface properties of a sample, the apparatus comprising:

a high precision capacitance sensor having a pick-up plate movably mounted relative to a drive plate;

means for transmitting force between an object remote from the pick-up plate and the pick-up plate;

means responsive to the position of the pick-up plate relative to the drive plate for providing an output signal proportional to the relative position.

*A3 cont'd*  
*2* 42. (Newly Added) The apparatus of claim *1* 41, wherein the means for transmitting force between an object remote from the pick-up plate and the pick-up plate includes the pick-up plate mechanically linked to the probe.

*42*  
*3*

<sup>3</sup>  
~~43~~. (Newly Added) The apparatus of claim ~~41~~<sup>1</sup>, wherein the means responsive to the position of the pick-up plate relative to the drive plate includes means for utilizing said output signal to control a vertical movement of the scanning head relative to the sample.

<sup>4</sup>  
~~44~~. (Newly Added) The apparatus of claim ~~43~~<sup>3</sup>, wherein the vertical movement of the scanning head relative to the sample is controlled to maintain a constant force on the sample as the surface property is measured.

A3  
Cont'd  
<sup>5</sup>  
~~45~~. (Newly Added) The apparatus of claim ~~41~~<sup>1</sup>, wherein the means responsive to the position of the pick-up plate relative to the drive plate includes means for applying an AC signal to the drive plate.

<sup>6</sup>  
~~46~~. (Newly Added) The apparatus of claim ~~41~~<sup>1</sup>, wherein the means responsive to the position of the pick-up plate relative to the drive plate synchronously demodulates the output signal to produce a DC signal proportional to the displacement of the pick-up plate.

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K 2

47. (Newly Added) A scanned probe microscope apparatus having a probe and a scanning head arranged for operative engagement of the surface of a sample for measuring a surface property thereof, the apparatus comprising:

a force sensor operatively located to measure the surface property, the force sensor having an output signal representative of the measured surface property, wherein the force sensor includes:

a pair of capacitive transducers, each transducer including a separate drive plate and a shared pick-up plate movably suspended between the drive plates, wherein said pick-up plate is capable of deflection between each of the drive plates; and

means for transmitting force from a point remote from the pick-up plate to the pick-up plate.

A3  
Cont'd

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48. (Newly Added) The apparatus of claim 47, further comprising means for measuring the output signal of the force sensor and utilizing the output signal to control a vertical movement of the scanning head.

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49. (Newly Added) The apparatus of claim 48, wherein the vertical movement of the scanning head is controlled to maintain a constant force on the sample as the surface topography is measured.

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*Pub. 11*  
50. (Newly Added) The apparatus of claim 47, further comprising means for applying a downward force to said probe, wherein said force sensor measures the force and the means for measuring the output signal of the force sensor converts the output signal to a signal representative of the force during an indentation test.

*11*  
51. (Newly Added) The apparatus of claim *7* 47, further comprising means responsive to the output signal for controlling the movement of the scanning head.

*A3 cont'd*  
*12*  
52. (Newly Added) The apparatus of claim *11* 51, wherein the movement of the scanning head is controlled in a vertical direction.

*13*  
53. (Newly Added) The apparatus of claim *12* 52, wherein the means responsive to the output signal further controls the movement of the scanning head in a two-dimensional horizontal direction.

*14*  
54. (Newly Added) The apparatus of claim *13* 53, wherein the means for controlling movement of the scanning head provides an output signal to an image display, wherein the image display provides an image representative of the surface property being measured.

*45*  
<sup>6</sup>

<sup>15</sup>  
55. (Newly Added) The apparatus of claim <sup>7</sup>47, further comprising means responsive to the output signal for providing an image representative of the surface topography.

*Sub  
#3*  
56. (Newly Added) A high resolution sensor apparatus for use with a scanned-probe microscope having a probe and a scanning head operably arranged for measuring surface properties of a sample, the apparatus comprising:

- A3  
cont'd*
- a. a sensor element, said sensor element including,
    - 1. a pair of capacitive transducers, each transducer including a separate drive plate, and a shared pickup plate, said pickup plate positioned between said separate drive plates, said drive plates having spaced opposing conductive surfaces when said pickup plate is mounted therebetween, said pickup plate further comprising a conductive central plate suspended by spring means between said drive plates, wherein said central plate is capable of deflection between the conductive surfaces of each of said drive plates;
    - 2. means for mechanically transmitting force from a point remote from said central plate to said central plate; and
  - b. means for providing an output signal representative of the surface property being measured, including means
- 7/*  
*46*

~~SUB~~  
K3

for applying an alternating current carrier signal to said pair of drive plates, wherein the signal to one of said drive plates is 180 degrees out of phase with the signal to the other of said drive plates.

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~~57~~

(Newly Added) The apparatus of claim <sup>16</sup>~~56~~, further comprising means for measuring the output signal of the sensor element and utilizing the output signal to control a vertical movement of the scanning head.

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~~58~~

(Newly Added) The apparatus of claim <sup>17</sup>~~57~~, wherein the vertical movement of the scanning head is controlled to maintain a constant force on the sample as the surface topography is measured.

A3  
cont'd

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~~59~~

(Newly Added) The apparatus of claim <sup>16</sup>~~56~~, further comprising means for applying a downward force to said probe, wherein said sensor element measures the force and the means for measuring the output signal of the sensor element converts the output signal to a signal representative of the force during an indentation test.

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~~60~~

(Newly Added) The apparatus of claim <sup>16</sup>~~56~~, further comprising means responsive to the output signal for controlling the movement of the scanning head.

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<sup>21</sup>  
~~61~~. (Newly Added) The apparatus of claim <sup>20</sup>~~60~~, wherein the movement of the scanning head is controlled in a vertical direction.

<sup>22</sup>  
~~62~~. (Newly Added) The apparatus of claim <sup>21</sup>~~61~~, wherein the means responsive to the output signal further controls the movement of the scanning head in a two-dimensional horizontal direction.

<sup>23</sup>  
~~63~~. (Newly Added) The apparatus of claim <sup>22</sup>~~62~~, wherein the means for controlling movement of the scanning head provides an output signal to an image display, wherein the image display provides an image representative of the surface property being measured.

<sup>24</sup>  
~~64~~. (Newly Added) The apparatus of claim <sup>16</sup>~~56~~, further comprising means responsive to the output signal for providing an image representative of the surface topography.

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